

WHAT IS CLAIMED IS:

1 1. An integrated circuit for providing a switchover from
2 a primary power source to a secondary power source, the
3 integrated circuit comprising:

4 a power source switchover circuit for detecting the
5 supply level of the primary power source and a voltage
6 threshold, the power source switchover circuit having a
7 plurality of input terminals, a first input terminal selectively
8 electrically coupled to the primary power source and a second
9 input terminal selectively electrically coupled to the secondary
10 power source, the power source switchover circuit further having
11 a plurality of output terminals;

12 a comparator, electrically coupled to the power source
13 switchover circuit, for indicating that the supply level of the
14 primary power source has decreased below the voltage threshold,
15 the comparator having a first and a second input terminal
16 connected to a first and a second output terminal of the power
17 source switchover circuit, respectively, the comparator further
18 having an output terminal;

19 a forced power source switchover circuit for detecting
20 that the supply level being received from the primary power

21 source by the integrated circuit drops below a predefined
22 threshold level, the forced power source switchover circuit
23 having at least one input terminal and at least one output
24 terminal, one input terminal being electrically connected to the
25 primary power source; and
26 a switchover circuit for initiating a switchover
27 operation based upon the indication from the comparator or upon
28 an indication that the forced power source switchover circuit
29 detects that the supply level being received from the primary
30 power source by the integrated circuit drops below the
31 predefined threshold level, the switchover logic circuit having
32 a first input terminal connected to the output terminal of the
33 comparator and a second input terminal connected to one output
34 terminal of the forced power source switchover circuit.

35 2. The integrated circuit according to claim 1, wherein
36 the forced power source switchover circuit is reactive to the
37 supply level of the primary power source transitioning from a
38 steady-state supply level to below the predefined threshold
39 level, the supply level transitioning faster than a
40 predetermined negative rate of change.

1 3. The integrated circuit according to claim 2, wherein
2 the negative rate of change is approximately 150 microseconds.

1 4. The integrated circuit according to claim 1, further
2 comprising circuitry connected to the power source switchover
3 circuit for selectively adjusting the indicating signal produced
4 by the comparator.

1 5. The integrated circuit according to claim 1, further
2 comprising circuitry connected to the forced power source
3 switchover circuit for selectively adjusting the first
4 predefined threshold level.

1 6. The integrated circuit according to claim 1, further
2 comprising a plurality of input terminals for receiving input
3 signals to configure the switchover logic circuit to selectively
4 adjust the predefined threshold level.

1 7. The integrated circuit according to claim 1, further
2 comprising a delay circuit for providing a time duration for the
3 substrate of the integrated circuit to settle from a first
4 voltage potential to a second voltage potential upon the
5 switchover from the secondary power source to the primary power
6 source.

1 8. The integrated circuit according to claim 1, wherein
2 the predefined threshold level detected by the forced power
3 source switchover circuit is below the crossing level of the
4 supply level of the primary power source and the voltage
5 threshold.

1 9. A method for performing a power source switchover from
2 a primary power source to a secondary power source, the method
3 comprising the steps of:

4 detecting that a supply level being received from the
5 primary power source decreases below a predefined threshold
6 level from a steady-state operating level, the supply level
7 transitioning faster than a predetermined negative rate of
8 change;

9 asserting a signal indicating to switch from the
10 primary power source to the secondary power source upon
11 detecting that the supply level being delivered from the primary
12 power source has decreased below the predefined threshold level;

13 detecting the signal indicating to switch from the
14 primary power source to the secondary power source; and

15 switching from the primary power source to the
16 secondary power source based upon detecting the signal
17 indicating to force a power source switchover.

1 10. The method according to claim 9, wherein the primary
2 power source is an external power source.

1 11. The method according to claim 9, wherein the secondary
2 power source is a battery.

1 12. The method according to claim 9, wherein the
2 predefined threshold level is below 2.5 volts.

1 13. The method according to claim 9, wherein the negative
2 rate of change is approximately 150 microseconds.

1 14. The method according to claim 9, further comprising
2 the steps of:
3 detecting the supply level being delivered from the
4 primary power source;
5 detecting a voltage potential of a substrate of an
6 integrated circuit; and
7 producing a compare signal indicative of the relative
8 values between the detected supply level being delivered from
9 the primary power source and the voltage potential of the
10 substrate.

1 15. The method according to claim 14, further comprising
2 the steps of:
3 receiving the compare signal and the signal indicating
4 to force the power source switchover;
5 determining an occurrence of a transition of either
6 the compare signal or the signal indicating to force the power
7 source switchover; and
8 initiating a switch from the primary power source to
9 the secondary power source upon the determination of the
10 occurrence of a transition of the compare signal or the signal
11 indicating to force the power source switchover.

1 16. A circuit comprising:

2 a first detection circuit for detecting a supply level
3 decrease of a power level from a primary power source, the
4 supply level transitioning from a steady-state supply level to
5 a predefined threshold level faster than a predetermined
6 negative rate of change, the first circuit generating at least
7 one signal in response to the supply level decreasing to the
8 predefined threshold level; and

9 a first switching circuit for switching from the
10 primary power source to a secondary power source in response to
11 the at least one signal.

1 17. The circuit according to claim 16, wherein the primary
2 power source is an external power source.

1 18. The circuit according to claim 16, wherein the
2 secondary power source is a battery.

1 19. The circuit according to claim 16, wherein the
2 predetermined negative rate of change is approximately 150
3 microseconds.

1 20. The circuit according to claim 16, further comprising
2 circuitry for adjusting a response time for the first detection
3 circuit.

1 21. The circuit according to claim 16, further comprising:
2 a second detection circuit for detecting a voltage
3 threshold of the power source switchover circuit and the supply
4 level being received from the primary power source, the second
5 detection circuit producing a plurality of signals based upon
6 the detecting; and
7 a second switching circuit for switching from the
8 primary power source to the secondary power source in response
9 to the plurality of signals based upon the detecting.

1 22. The circuit according to claim 21, further comprising
2 circuitry for selectively responding to the first and the second
3 detection circuits.

- 1 23. The circuit according to claim 21, further comprising
2 an input terminal to selectively disable a switchover from the
3 primary to the secondary power source.

1 24. A system comprising:

2 a volatile device for maintaining data, the volatile
3 device receiving power delivered from a primary power source;

4 a forced power source switchover circuit for detecting
5 a transition in a supply level from a primary power source, the
6 forced power source switchover circuit reactive to the supply
7 level of the primary power source transitioning from a steady-
8 state operating level to a predefined threshold level, the
9 supply level ~~transitioning~~ at a rate faster than a predetermined
10 negative rate of change; and

11 a switchover circuit coupled to the forced power
12 source switchover circuit and the volatile device for asserting
13 a switch from the primary power source to a secondary power
14 source to prevent the volatile device from losing data upon
15 power being removed from the volatile device.

1 25. The system according to claim 24, wherein the
2 predetermined negative rate of change is at most 150
3 microseconds.

1 26. The system according to claim 24, wherein the forced
2 power switchover circuit provides an indication to the
3 switchover circuit approximately at the instant of the primary
4 power source crossing the predefined threshold level.

1 27. The system according to claim 24, further comprising
2 a power source switchover circuit connected to the switchover
3 circuit, the power source switchover circuit detecting that the
4 power being delivered from the primary power source
5 transitioning below a trip point, the transitioning occurring at
6 a rate slower than the predetermined negative rate of change.

1 28. The system according to claim 24, wherein the system
2 includes at least one of the following: a memory system, a
3 computing system, a communication system, and a clock system.

1 29. The system according to claim 24, wherein the volatile
2 device includes at least one of the following: a memory device
3 and a clock device.

1 30. A circuit for providing an indication that a signal
2 level of a primary power source transitions below a predefined
3 threshold level, the circuit comprising:

4 a first transistor electrically coupled to a second
5 transistor, a common node being formed along the coupling;

6 a third transistor having a gate terminal coupled to
7 the common node;

8 at least one pair of series connected trimming
9 transistors, a first transistor of the at least one pair of
10 trimming transistors having a gate terminal coupled to the
11 common node, the at least one pair of series connected trimming
12 transistors coupled to a drain/source region of the third
13 transistor.

1 31. The circuit according to claim 30, further including
2 a fuse electrically coupled to a gate terminal of a second
3 transistor of the at least one pair of trimming transistors, the
4 fuse being blown to selectively turn on/off the second
5 transistor of the at least one pair of trimming transistors.

1 32. The circuit according to claim 30, wherein the first
2 transistor is coupled to the primary power source and a gate
3 terminal of the second transistor is coupled to a substrate of
4 the circuit.

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